

IV. REMARKS

Matter Added to Amended Claims 1, 8, and 18, and to New Claims 20 - 25

In Claim 1, support for the term “metallic region” may be found in the specification at Page 5, Line 23 (metal workpiece), Page 5, Line 27 (surface region), and Page 6, Lines 3 - 4 (a portion of the surface of the golf club face). Support for “creating a local fine grained microstructure in the region without significantly affecting the mechanical properties of other portions of the head” may be found at Page 4, Lines 3 - 5 (passing a rotating FSP tool through a metallic material to locally create a fine grain microstructure providing improved mechanical properties) and Page 6, Lines 19 - 21 (hardness is imparted to the club face surface region without substantially affecting the forgability, mechanical properties, or impact resistance of the supporting material).

In Claim 8, support for the term “region” in association with a metallic workpiece may be found in the specification at Page 5, Line 23 (metal workpiece) and Page 5, Line 27 (surface region). Support for “creating a local fine grained microstructure in the region without significantly affecting the mechanical properties of other portions of the workpiece” may be found at Page 4, Lines 3 - 5 (passing a rotating FSP tool through a metallic material to locally create a fine grain microstructure providing improved mechanical properties) and Page 6, Lines 19 - 21 (hardness is imparted to the club face surface region without substantially affecting the forgability, mechanical properties, or impact resistance of the supporting material).

In Claim 18, support for the term “metallic region of the face surface” may be found in the specification at Page 5, Line 23 (metal workpiece), Page 5, Line 27 (surface region), and Page 6, Lines 3 - 4 (a portion of the surface of the golf club face). Support for “a local fine grained microstructure whose mechanical properties are distinct from the mechanical properties of other portions of the head” may be found at Page 4, Lines 3 - 12 (passing a rotating FSP tool through a metallic material to locally create a fine grain microstructure providing improved mechanical properties) and Page 6, Lines 19 - 21 (hardness is imparted to the club face surface region without substantially affecting the forgability, mechanical properties, or impact resistance of the supporting material).

Support for new Claim 20 may be found at Page 4, Lines 20 - 24.

Support for new Claim 21 may be found at Page 4, Lines 24 - 25.

Support for new Claim 22 may be found at Page 4, Lines 25 - 27.

Support for new Claim 23 may be found at Page 6, Lines 17 - 19.

Support for new Claim 24 may be found at Page 7, Lines 10 - 14.

Support for new Claim 25 may be found at Page 7, Lines 19 - 25.

The Rejection of Claims 1, 8, 14, 16, and 18

The examiner notes that Anderson teaches a club head with a face welded thereto and that Thomas discloses a friction stir welding process. The examiner argues that a person of ordinary skill in the art would have found it obvious to apply Thomas' friction stir welding to attach a golf club face to the club head, in order to reduce the oxidation of the workpiece.

As the examiner stated, however, Thomas teaches friction stir welding, not friction stir processing, and this distinction is crucial in considering the applicability of the teaching of Thomas to the claimed invention. Thomas teaches a friction stir welding method in which frictional heat generated by a moving probe creates a plasticized region in the workpiece. Cooling of the plasticized region results in solidification, which can be used to advantage for repairing cracks and joining members. Thomas, Abstract. Thomas, however, does not teach the advantages of friction stir processing, as claimed in the present invention and as opposed to friction stir welding, for, paraphrasing the wording of amended Claim 1, "creating a local fine grained microstructure in [a predetermined metallic region of the surface of a golf club face] without significantly affecting the mechanical properties of other portions of the [golf club] head". This feature of the claimed invention makes possible significant improvements in golf clubs compared to approaches in the prior art for providing a golf club with the combined desirable features of hardness in the sweet spot on the club face, an economical manufacturing process, avoiding losses from interfaces between portions of the club, proper weight distribution, and reasonable wear parameters. Specification, Page 2, Line 25 - Page 4, Line 2. Similar claim recitations are included in amended Claims 8 and 18.

Thomas does not teach how to friction stir process a thin surface layer to improve hardness without significantly affecting the mechanical properties of the bulk metal. Specification, Page 4, Lines 10 - 12. The examiner has not provided any rationale for how a person of ordinary skill in the art would find this technique obvious from the method of friction stir welding taught in Thomas.

For this reason, the rejection of Claims 1, 8, 14 (which depends from Claim 8), and 18 should be rescinded (Claim 16 has been canceled).

The Rejection of Claims 2, 3, 4, 5, 6, 7, 9, 10, 11, 12, 13, 17, and 19

All of these claims (Claim 15 has been canceled) depend from Claim 1, 8 or 14, either directly or through an intermediate claim. The rejection of these claims should be withdrawn for the reasons discussed above with respect to Claims 1, 8, 14 and 18.

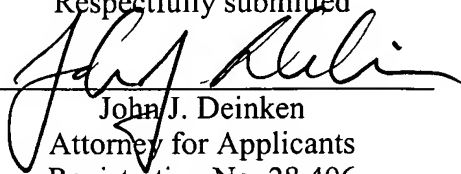
New Claims 20 - 25

All of these claims depend, either directly or through an intermediate claim, from Claim 18. As such, all are believe to be patentable for the reasons discussed above with respect to Claims 1, 8, 14 and 18.

V. CONCLUSION

The remaining claims in this application (Claims 1 - 14 and 17 - 25) are believed to be in condition for allowance for the reasons discussed above. Should some impediment to allowability remain, however, the Examiner is invited to contact the undersigned to assist in advancing the claims to issue.

Respectfully submitted



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